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| 09/924,054 | 08/08/2001 | Hiroyuki Saito | 0050-0094 | 6171 |

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| EXAMINER |
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SHEW, JOHN

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| ART UNIT | PAPER NUMBER |
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2664

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/924,054

Applicant(s)

SAITO, HIROYUKI

Examiner

John L. Shew

Art Unit

2664

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-4, 6-8, 10-12 and 14-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 17, 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Kodialam et al. (Patent No. US 6538991 B1).

Claim 17, Kodialam teaches a method for determining traffic capacities for nodes in a network (FIG. 3, Abstract lines 1-11) referenced by the packet network with constraint-based paths based on capacities of network nodes, the method comprising specifying a range having a boundary forming an area that includes a plurality of nodes making up the network (FIG. 3, col. 5 lines 19-24) referenced by the Network 300 with a boundary of Nodes N, identifying a first one of the plurality of nodes that is proximate to the boundary as an ingress node to make incoming traffic available to other nodes in the network (FIG. 3, col. 5 lines 36-67, col. 6 lines 1-5) referenced by the Source Node S1

of plurality $S_1 S_2 S_3$ with associated available link l_{ij} capacities, identifying a second one of the plurality of nodes that is proximate to the boundary as an egress node to make outgoing traffic from the network available to another network (FIG. 3, col. 5 lines 36-67, col. 6 lines 1-5) referenced by the Destination Node D_1 of plurality $D_1 D_2 D_3$ with associated available link l_{ij} capacities, identifying an incoming traffic rate for the ingress node (col. 6 lines 18-24, FIG. 4, col. 7 lines 15-18, lines 50-55) referenced by the traffic rate of Label Switch Protocol request (o, t, bd) at step 401, identifying an outgoing traffic rate for the egress node (col. 6 lines 18-24, FIG. 4, col. 7 lines 15-18, lines 50-55) referenced by the traffic rate of Label Switch Protocol request (o, t, bd) at step 401, determining paths from the ingress node to the egress node that carry the incoming traffic via at least a subset of the plurality of nodes (FIG. 4, col. 8 lines 30-54) referenced by the split demand programming system to allocate the LSP request over a set of paths to maximize the maxflow values θ_{sd} and θ_{ot} shown in step 404, calculating link capacities for the determined paths (FIG. 4, col. 7 lines 15-40) referenced by the residual capacity vector R for the set of links, and determining traffic capacities for the at least the subset of the plurality of nodes using the calculated link capacities (FIG. 4, col. 8 lines 30-54, col. 9 lines 15-23) referenced by the step 404 programming to solve for a path based on the network $G(N,L,B)$ constraints with the path route shown in equation (2) for each element (s,d) .

Claim 18, Kodialam teaches identifying a third one of the plurality of nodes proximate to the boundary as a second ingress node to make second incoming traffic available to

other nodes in the network (FIG. 3, col. 5 lines 36-67, col. 6 lines 1-5) referenced by the Source Node S2 of plurality S1 S2 S3 with associated available link l_{ij} capacities, identifying a second incoming traffic rate for the second ingress node (FIG. 3, col. 5 lines 36-67, col. 6 lines 1-17) referenced by the ingress-egress pair (S2,D2) and their bandwidth capacity, determining paths from the second ingress node to the egress node that carry the second incoming traffic via certain of the at least the subset of the plurality of nodes (FIG. 4, col. 8 lines 30-54) referenced by the split demand programming system to allocate the LSP request over a set of paths to maximize the maxflow values θ_{sd} and θ_{ot} shown in step 404, calculating link capacities for the determined paths from the second ingress node (FIG. 4, col. 7 lines 15-40) referenced by the residual capacity vector R for the set of links, and determining traffic capacities for the certain of the at least the subset of the plurality of nodes using the calculated link capacities (FIG. 4, col. 8 lines 30-54, col. 9 lines 15-23) referenced by the step 404 programming to solve for a path based on the network $G(N,L,B)$ constraints with the path route shown in equation (2) for each element (s,d).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 2, 4, 7, 6, 8, 11, 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benmohamed et al. (Patent No. US 6795399 B1) in view of Mitra et al. (Patent number US 6721270 B1).

Claim 3, Benmohamed teaches a communication network designing circuit for multiple point communication service (Abstract lines 1-8) referenced by the apparatus for designing IP networks for optimistic link capacity requirements, for permitting arbitrary communication within a predetermined range (column 2 lines 5-10) referenced by the upper and lower link capacity bounds, by providing traffic flowing in from an ingress node through which data flows in from another network (FIG. 5, column 14 lines 13-25) referenced by the input VPN demands for a given link Step 502, and traffic flowing out from an egress node through which data is fed to the other network (FIG. 5, column 14 lines 25-33, column 4 lines 21-31) referenced by the output link capacity C_l^{WFQ} for link l of all VPN demands routed through link l Step 508 wherein the V set of nodes corresponding to points of presence is the initial backbone network topology of traffic flow, comprising setting means for setting a mathematical programming problem for deriving said multiple point communication service (FIG. 1, FIG. 2, column 5 lines 12-23, column 7 lines 30-35) referenced by the Worst-Case Link Capacity Requirements Processor 14 which sets the input link requirements and the optimization based on equation (5), to permit arbitrary communication within the predetermined range (column

2 lines 5-10) referenced by the upper and lower link capacity bounds for the predetermined range, per-user necessary link capacity calculating condition generating means for generating a constraint expression for calculating a necessary link bandwidth for each link carrying traffic flowing in from each ingress node (FIG. 4, col. 13 lines 29-56) referenced by the user-selected congestion scenario and worst-case link capacity requirements Step 402 for generating constraints (H^{best} , H^{hop} , H^{one}) to compute the bandwidth of Optimistic Link Capacity Step 404 for each link l inclusive of incoming node traffic, and link including condition generating means for generating a constraint expression so as not to exceed a link capacity limit in each link (col. 12 lines 7-24) referenced by the limits of upper and lower bounds of capacities as a function of H^{hop} and H^{one} as shown in equations (17)-(20), and optimizing means for solving the mathematical programming problem set by said setting means (FIG. 1, FIG.2, column 5 lines 23-29) referenced by the Network Topology Optimization Processor 18 calculating the network cost to obtain the final network design, and obtaining a path for said multiple point communication service (FIG. 2, column 5 lines 28-33) referenced by the resulting route of each traffic flow f_i . Benmohamed does not teach an optimization reference generating means for setting objective function for minimizing a link load. Mitra teaches an optimization reference generating means for setting objective function for minimizing a link load (FIG. 2, col. 5 lines 45-67, col. 6 lines 1-47) referenced by the Solve Multi-Commonality Flow to Maximize QoS Network Revenue step 20 followed by Solve MCF to Minimize Resource Usage step 25 wherein the resource usage is summed over the links l , in an object network coupled to the other network (FIG. 2, col.

6 lines 55-67) referenced by the Residual Network Topology which is coupled to the current network being optimized, and serving as an optimization reference and setting a constraint expression for deriving said link load (FIG. 2, col. 6 lines 55-67) referenced by the Residual Network which serves as a reference of remaining capacities for optimization through Solving Link-Based MCF to Maximize BE Revenue step 35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multicommodity flow method of Mitra to the link capacity computation method of Benmohamed for the purpose of solving traffic engineering problems in a network having at least one QoS service class and at least one class of service that is not a QoS class as suggested by Mitra (col. 3 lines 21-24).

Claim 2, Benmohamed teaches wherein said path for said multiple point communication service is derived on the basis of a preliminarily set optimization standard (column 4 lines 21-45) referenced by the input to the IP network design system the IP flow demand specified by f_i given as a 6-tuple $f_i = (s_i, t_i, a_i, n_i, d_i, r_i)$ where s_i and t_i are the source and destination nodes for the path and f_i as the input standard.

Claim 4, Benmohamed teaches wherein the optimization reference generating means, the per-user necessary link capacity calculating condition generating means and the link including condition generating means operate in parallel with respect to each other (FIG. 1, col. 4 lined 3-20) referenced by the Congestion Scenario (H_0) providing parallel

inputs to the Worst-Case Link Capacity Requirements Processor 14 and the Optimistic Link Capacity Design Processor 16.

Claim 7, Benmohamed teaches a communication network designing method for multiple point communication service (Abstract lines 1-8) referenced by the apparatus for designing IP networks for optimistic link capacity requirements, for permitting arbitrary communication within a predetermined range (column 2 lines 5-10) referenced by the upper and lower link capacity bounds, by providing traffic flowing in from an ingress node through which data flows in from another network (FIG. 5, column 14 lines 13-25) referenced by the input VPN demands for a given link Step 502, and traffic flowing out from an egress node through which data is fed to the other network (FIG. 5, column 14 lines 25-33, column 4 lines 21-31) referenced by the output link capacity C_l^{WFQ} for link l of all VPN demands routed through link l Step 508 wherein the V set of nodes corresponding to points of presence is the initial backbone network topology of traffic flow, comprising setting a mathematical programming problem for deriving said multiple point communication service (FIG. 1, FIG. 2, column 5 lines 12-23, column 7 lines 30-35) referenced by the Worst-Case Link Capacity Requirements Processor 14 which sets the input link requirements and the optimization based on equation (5), to provide arbitrary communication within the predetermined range (column 2 lines 5-10) referenced by the upper and lower link capacity bounds for the predetermined range, the setting comprising generating a constraint expression for calculating a necessary link bandwidth of each link carrying traffic flowing in from each ingress node (col. 7 lines

30-35) referenced by equation (5) the minimum link capacity c_l^{FIFO} , and generating a constraint expression so as not to exceed a link capacity limit in each link (col. 12 lines 7-24) referenced by the limits of upper and lower bounds of capacities as a function of H^{hop} and H^{one} as shown in equations (17)-(20), solving the mathematical programming problem set by said setting (FIG. 1, FIG.2, column 5 lines 23-29) referenced by the Network Topology Optimization Processor 18 calculating the network cost to obtain the final network design, and obtaining a path for said multiple point communication service (FIG. 2, column 5 lines 28-33) referenced by the Output Final Design with resulting route of each traffic flow f_i . Benmohamed does not teach setting an objective function for minimizing a link load in an object network operatively coupled to the other network and where the objective function services as an optimization reference.

Mitra teaches setting objective function for minimizing a link load (FIG. 2, col. 5 lines 45-67, col. 6 lines 1-47) referenced by the Solve Multi-Commonality Flow to Maximize QoS Network Revenue step 20 followed by Solve MCF to Minimize Resource Usage step 25 wherein the resource usage is summed over the links l , in an object network operatively coupled to the other network (FIG. 2, col. 6 lines 55-67) referenced by the Residual Network Topology which is coupled to the current network being optimized, and where the objective functions serves as an optimization reference (FIG. 2, col. 6 lines 55-67) referenced by the Residual Network which serves as a reference of remaining capacities for optimization through Solving Link-Based MCF to Maximize BE Revenue step 35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multicommodity flow method of Mitra to the link capacity computation method of Benmohamed for the purpose of solving traffic engineering problems in a network having at least one QoS service class and at least one class of service that is not a QoS class as suggested by Mitra (col. 3 lines 21-24).

Claim 6, Benmohamed teaches wherein said path for said multiple point communication service is derived on the basis of a preliminarily set optimization standard (column 4 lines 21-45) referenced by the input to the IP network design system the IP flow demand specified by f_i given as a 6-tuple $f_i = (s_i, t_i, a_i, n_i, d_i, r_i)$ where s_i and t_i are the source and destination nodes for the path and f_i as the input standard.

Claim 8, Benmohamed teaches wherein the setting objective function the setting a constraint expression the generating a constraint expression for calculating and the generating a constraint expression so as not to exceed a link capacity limit in each link operate in parallel with respect to each other (FIG. 1, col. 4 lined 3-20) referenced by the Congestion Scenario (Ho) providing parallel inputs to the Worst-Case Link Capacity Requirements Processor 14 and the Optimistic Link Capacity Design Processor 16.

Claim 11, Benmohamed teaches a storage medium storing a communication network design control program (column 3 lines 20-40) referenced by the CPU RAM and software instructions to perform the methodology, for designing a communication

network for multiple point communication service (Abstract lines 1-8) referenced by the method for designing IP networks for optimistic link capacity requirements, for permitting arbitrary communication within a predetermined range (column 2 lines 5-10) referenced by the upper and lower link capacity bounds, by providing traffic flowing in from an ingress node through which data flows in from an other network (FIG. 5, column 14 lines 13-25) referenced by the input VPN demands for a given link Step 502, and traffic flowing out from an egress node through which data is fed to the other network (FIG. 5, column 14 lines 25-33, column 4 lines 21-31) referenced by the output link capacity C_l^{WFQ} for link l of all VPN demands routed through link l Step 508 wherein the V set of nodes corresponding to points of presence is the initial backbone network topology of traffic flow, said communication network design control program comprising setting a mathematical programming problem for deriving said multiple point communication service (FIG. 2, column 5 lines 12-23, FIG. 3, column 12 lines 38-53) referenced by the input of point-to-point VPN demands and computation of worst-case line capacity Step 304, to provide arbitrary communication within the predetermined range (column 2 lines 5-10) referenced by the upper and lower link capacity bounds for the predetermined range, the setting comprising setting a constraint expression for deriving a link load (col. 7 lines 25-35) referenced by the constraint minimum link capacity c_l^{FIFO} , generating a constraint expression for selecting a route for traffic flowing in from the other network (col. 4 lines 21-48, col. 6 lines 34-55) referenced by the IP flow demand f_i which has a route based on source s and destination t wherein the constraint is the share of link capacity r_l^i , generating a constraint expression for calculating a necessary link

bandwidth of each link carrying traffic flowing in from each ingress node (col. 9 lines 12-26) referenced by the link l^* which is the bottleneck link for demand l used for determination of link capacity C_l^{FIFO} equation (8), and generating a constraint expression so as not to exceed a link capacity limit in each link (col. 9 lines 27-33) referenced by upper bound capacity $C_l^{FIFO}(H^{max})$ based on the max of all links, solving the mathematical programming problem set in said setting step (FIG. 1, FIG.2, column 5 lines 23-29) referenced by the Network Topology Optimization Processor 18 calculating the network cost to obtain the final network design, and obtaining a path for said multiple point communication service (FIG. 2, column 5 lines 28-33) referenced by the Output Final Design with resulting route of each traffic flow f_i .

Claim 10, Benmohamed teaches further comprising deriving said path for said multiple point communication service on the basis of a preliminarily set optimization standard (column 4 lines 21-45) referenced by the input to the IP network design system the IP flow demand specified by f_i given as a 6-tuple $f_i=(s_i, t_i, a_i, n_i, d_i, r_i)$ where s_i and t_i are the source and destination nodes for the path and f_i as the input standard.

Claim 12, Benmohamed teaches wherein the setting a constraint expression the generating a constraint expression for selecting a route the generating a constraint expression for calculating a necessary link bandwidth and the generating a constraint expression operate in parallel with respect to each other (FIG. 1, col. 4 lined 3-20) referenced by the Congestion Scenario (H_0) providing parallel inputs to the Worst-Case

Link Capacity Requirements Processor 14 and the Optimistic Link Capacity Design Processor 16.

Claims 15, 14, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benmohamed, in view of Debey (Patent No. US 6519693 B1).

Claim 15, Benmohamed teaches a communication network design control program (column 3 lines 20-40) referenced by the CPU RAM and software instructions to perform the methodology, for designing a communication network for multiple point communication service (Abstract lines 1-8) referenced by the method for designing IP networks for optimistic link capacity requirements, for permitting arbitrary communication within a predetermined range (column 2 lines 5-10) referenced by the upper and lower link capacity bounds, by providing traffic flowing in from an ingress node through which data flows in from an other network (FIG. 5, column 14 lines 13-25) referenced by the input VPN demands for a given link Step 502, and traffic flows out from an egress node through which data is fed to the other network (FIG. 5, column 14 lines 25-33, column 4 lines 21-31) referenced by the output link capacity C_l^{WFQ} for link l of all VPN demands routed through link l Step 508 wherein the V set of nodes corresponding to points of presence is the initial backbone network topology of traffic flow, said communication network design control program comprising setting a

mathematical programming problem for deriving said multiple point communication service (FIG. 2, column 5 lines 12-23, FIG. 3, column 12 lines 38-53) referenced by the input of point-to-point VPN demands and computation of worst-case line capacity Step 304, to provide arbitrary communication within the predetermined range (column 2 lines 5-10) referenced by the upper and lower link capacity bounds for the predetermined range, the setting comprising setting a constraint expression for deriving said link load (col. 7 lines 25-35) referenced by the constraint minimum link capacity c_i^{FIFO} , generating a constraint expression for calculating a necessary link bandwidth of each link carrying traffic flowing in from each ingress node (col. 9 lines 12-26) referenced by the link l^* which is the bottleneck link for demand l used for determination of link capacity C_i^{FIFO} equation (8), and generating a constraint expression so as not to exceed a link capacity limit in each link (col. 9 lines 27-33) referenced by upper bound capacity $C_i^{FIFO}(H^{max})$ based on the max of all links, solving the mathematical programming problem set in said setting (FIG. 1, FIG.2, column 5 lines 23-29) referenced by the Network Topology Optimization Processor 18 calculating the network cost to obtain the final network design, and obtaining a path for said multiple point communication service (FIG. 2, column 5 lines 28-33) referenced by the Output Final Design with resulting route of each traffic flow f_i . Benmohamed does not teach a transmission medium transmitting a communication program.

Debey teaches a transmission medium transmitting a communication program (FIG.2, column 2 lines 40-46, column 3 lines 46-48) referenced by the CATV network for program transmission.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to transmit the network design program of Benmohamed over an information network as suggested by Debey for the purpose of increasing greater accessibility to information required to be accessed by more than one person at the same time (Debey column 1 lines 33-40).

Claim 14, Benmohamed teaches said communication network design control program operates said computer for obtaining said path for said multiple point communication service is on the basis of a preliminarily set optimization standard (column 4 lines 21-45) referenced by the input to the IP network design system the IP flow demand specified by f_i given as a 6-tuple $f_i=(s_i, t_i, a_i, n_i, d_i, r_i)$ where s_i and t_i are the source and destination nodes for the path and f_i as the input standard.

Claim 16, Benmohamed teaches wherein the setting a constraint expression the generating a constraint expression the operating said computer for generating a constraint expression for calculating a necessary link bandwidth and the operating said computer for generating a constraint expression so as not to exceed a link capacity limit in each link operate in parallel with respect to each other (FIG. 1, col. 4 lined 3-20) referenced by the Congestion Scenario (Ho) providing parallel inputs to the Worst-Case Link Capacity Requirements Processor 14 and the Optimistic Link Capacity Design Processor 16.

Citation of Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patent No. US 6363319 B1, Hsu discloses a constraint-based route selection method using biased cost.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John L. Shew whose telephone number is 571-272-3137. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read "Frank Duong", with a stylized, cursive script.

js

FRANK DUONG
PRIMARY EXAMINER